

Serial No. 09/757,955Docket No.: 55476US002**Remarks**

Applicants have amended the title as recommended by the Examiner, editorially amended a patent citation at page 2 and the paragraph spanning pages 17 and 18, and amended the first paragraph at page 14 to provide more explicit support for the language of claims 13 – 17. Support for the amendment to independent claims 1 and 23 can be found in the Written Description at, e.g., page 8, line 21 through page 9, line 28; page 11, lines 1 – 20; page 12, lines 19 – 28 and page 15, lines 21 – 23. Support for the amendment to claim 3 can be found at, e.g., page 4, line 24 and page 8, line 28. Support for the amendment to claim 5 can be found at, e.g., page 9, lines 24 – 30. Support for the amendment to claim 27 can be found at, e.g., page 1, line 19; page 18, lines 20 – 22 and page 20, lines 8 – 14. Support for the amendment to claim 30 can be found at, e.g., page 24, lines 1 – 2. Claims 6, 7, 12, 13, 18, 31, 42, 45, 46 and 58 have been rewritten in independent form to include all of the limitations of the base claim and any intervening claims. Following entry of this amendment, claims 1 – 62 will be pending in this application with claims 63 – 80 having been withdrawn.

The Office Action included a PTO Form 892 citing 4 references. Applicants had already cited 3 of those references (viz., U.S. Patent Nos. 1,043,021 and 4,102,301, and U.K Patent No. 1,278,099) on previously-submitted PTO Forms 1449. Applicants request that copies of the previously-submitted PTO Forms 1449, marked as being considered and initialed by the Examiner, be returned with the next official communication.

Applicants thank the Examiner for extending to the undersigned attorney the courtesy of an in-person interview on October 30, 2003. The Examiner's interview summary correctly sets out the substance of the interview. Any remaining points discussed are set out below.

On August 7, 2003 restriction was requested from among the following Groups of claims:

- I. Claims 1 – 62, drawn to a method for improving the uniformity of a wet coating on a substrate, classified in class 427, subclass 359.
- II. Claims 63 – 80 drawn to an improvement station/apparatus for improving the uniformity of a wet coating on a substrate, classified in class 118, subclass 110.

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Applicants hereby confirm their election of Group I, viz. claims 1 – 62, with traverse. All of the claims involve improvements in coating uniformity, and could be examined in a single application.

The Drawing was objected to on grounds that “the axes in the graphs do not have units associated with them”. This was deliberate and no correction is needed. As stated in the written description (see e.g., page 22, line 19 through page 23, line 2) and as identified in the Drawing, the axes are “dimensionless” and thus have no units.

The disclosure was objected to on grounds that the formula shown at page 26, line 30 appeared to be incorrect. Applicants respectfully disagree. The formula is correctly stated in the Written Description as follows:

$$S = hC(4000\{abs(X-n/d)\}^2 + 1/d + 2(X-n/d)\text{sign}(n/d-X))$$

and the term “sign” should not read “sine”. The value $\text{sign}(n/d-X)$ will be +1 when $(n/d-X)$ is positive and -1 when $(n/d-X)$ is negative.

The other objections to the Specification noted at pages 3 – 4 of the Office Action have been attended to as noted above.

Rejection of Claims 46 - 48 under 35 USC §112

Claims 46 – 48 were rejected under 35 USC §112, second paragraph, as being indefinite on grounds that et al.), on grounds that:

“Claim 46 recites the fraction m/d where d < 41. This fraction is inclusive of undefined fractional roll sizes since d < 41 includes 0. Further, this fraction is inclusive of negative fractional roll sizes since d < 41 is inclusive of values of d < 0. It is unclear from the disclosure whether fractional roll sizes can be negative. Similarly, claims 47 and 48 recite values of the denominators t and v as between -20 and 20. This range is inclusive of 0 and, consequently, claims 47 and 48 are inclusive of undefined numerical values.”

Applicants respectfully disagree. Those skilled in the art will appreciate that the roll periods defined by claim 46 and the roll sizes defined by claims 47 and 48 necessarily are positive values and that negative roll periods or roll diameters could not be chosen (see also page 26, lines 1 – 5). Those skilled in the art will thus appreciate that the recited fractional roll sizes are a ratio of two positive values. Moreover, since claims 46, 47 and 48 recite that pairs of rolls are not related as fractional roll sizes expressed by certain

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equations, the presence or absence of undefined or negative values for the equations does not require that the fractional roll sizes be undefined or negative, but rather that they not be so.

**Rejection of Claims 1, 2, 5, 10, 11, 17, 23, 24, 26 – 29,
32 – 33, 37, 38, 49, 55 – 57 and 59 under 35 USC §102(b)**

Claims 1, 2, 5, 10, 11, 17, 23, 24, 26 – 29, 32 – 33, 37, 38, 49, 55 – 57 and 59 have been rejected under 35 USC §102(b) as being anticipated by U.S. Patent No. 4,102,301 (Reade et al.). This list of claims does not include claims 51 and 52, which were not dealt with elsewhere in the Office Action. Applicants assume that claims 51 and 52 were also intended to be rejected under 35 USC §102(b) as being anticipated by Reade et al., since these claims were mentioned on page 6, lines 14 – 16 of the Office Action amidst discussion of the other claims rejected under 35 USC §102(b). In any event, applicants request reconsideration and withdrawal of the 35 USC §102(b) rejection.

Reade et al. describe a coating device which in its Fig. 2 embodiment employs two contrarotating rollers per side to spread the applied coating. Reade et al. do not disclose pick-and-place devices that rotate or translate in the direction of substrate motion, and do not disclose or recognize that using more than its two disclosed contrarotating rollers could provide a significant improvement in coating uniformity and defect reduction.

The Office Action also says that:

"With respect to claim 5, the substrate is a moving web and the rolls rotate with the web [c. 3, l. 11 - c. 4, l. 20]. Please note that the examiner has not interpreted the term "with" as conveying any direction of rotation (i.e. co-rotation or contra-rotation). Since applicant has not defined this term, the examiner has accorded it the broadest reasonable interpretation within the context of the disclosure: "a function word to indicate a participant in an action, transaction, or arrangement<works ~ his father>." Therefore, insofar as the limitation "rotate with the belt or web" indicates that the rollers and the web or belt participate in action, transaction, or arrangement, Reade's teaching of rollers moving as the web passes beneath anticipates this limitation.

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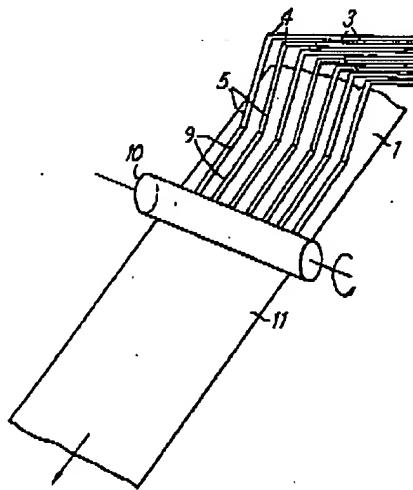
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Applicants defined the phrase "the rolls rotate with the belt or web" in the Written Description, e.g., at page 9, lines 24 – 30. In the interest of advancing prosecution applicants have amended claim 5 to recite that the rolls "are carried with the belt or web in its motion".

Applicants accordingly request withdrawal of the rejection of claims 1, 2, 5, 10, 11, 17, 23, 24, 26 – 29, 32 – 33, 37, 38, 49, (51, 52), 55 – 57 and 59 under 35 USC §102(b) as being anticipated by Reade et al.

Rejection of Claim 25 under 35 USC §102(b) or 35 USC §103(a)

Claim 25 was rejected under 35 USC §102(b) as anticipated by or, in the alternative under 35 USC §103(a) as obvious over Reade et al. Applicants request reconsideration and withdrawal of this 35 USC §102(b)/§103(a) rejection. Reade et al. are concerned with improved cross-web uniformity, not improved down web uniformity. Reade et al. lay down parallel lines 9 of coating material through tubes 3 whose free ends 5 trail upon the web 1 (see e.g., col. 2, lines 43 – 67 and Fig. 1):



Reade et al. do not show or suggest spraying as recited in claim 25. Moreover, as noted above Reade et al. do not disclose pick-and-place devices that rotate or translate in the direction of substrate motion, and do not disclose or recognize that using more than its two disclosed contrarotating rollers could provide a significant improvement in coating

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uniformity and defect reduction. Applicants accordingly request withdrawal of the rejection of claim 25 under 35 USC §102(b) as anticipated by or, in the alternative under 35 USC §103(a) as obvious over Reade et al.

**Rejection of Claims 30, 33 – 36, 39 – 41, 43, 44,
50, 53, 54 and 60 – 62 under 35 USC §103(a)**

Claims 30, 33 – 36, 39 – 41, 43, 44, 50, 53, 54 and 60 – 62 were rejected under 35 USC §103(a) as being unpatentable over Reade et al. According to the Office action:

"The teaching of Reade is detailed above. Although Reade teaches a specific method of application, the rollers serve to spread- and even-out the applied coating. It is clear, therefore, that the rollers could advantageously be used with a coating applied in any pattern, including those recited by applicant in these claims."

The correct standard for a determination of obviousness under 35 USC §103 is not whether something "could advantageously be used" but rather whether the prior art suggests the desirability of a combination, see MPEP §2143.01. As noted above, Reade et al. lay down parallel lines 9 of coating material. The parallel lines 9 are aligned with and have uniform thickness in the direction of motion. Reade et al. do not show or suggest application of an uneven coating having "periodically repeated voids in the direction of motion" as recited in amended claim 30; application of an uneven coating that initially has a "thickness that varies in the direction of motion" as recited in claims 33 – 35; application of an uneven coating that is "discontinuous in the direction of motion" as recited in claim 36; application of an uneven coating that is "periodically applied" as recited in claim 44; or application of an uneven coating in "two or more abutting lanes" as recited in claim 50.

The Office action also says that:

"Further, with respect to claims 39 - 41, 43, and 44, transfer of a coating material from a transfer roller or web is a known means of applying a coating to a moving web and it would have been obvious to modify the method of Reade to do so."

Setting aside Reade et al.'s Examples 6 and 7 (which are said to be comparative examples), Reade et al.'s thinnest reported dry coating thickness was 3.3 µm (see

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Examples 2 – 4; Example 1 may have been similar in that it also employed a 45% latex but only the 7.6 μm wet coating weight was reported). Applicants report formation of much thinner coatings, especially when a transfer belt is employed (see Example 1, where coating calipers as low as 0.2 μm were obtained). As reported by applicants at page 18, lines 1 – 16, use of a transfer belt eliminates a three phase (air, coating liquid and belt) wetting line at the coating application region, thereby making application of the coating liquid much easier than is the case for direct coating of a dry web and reducing the percentage of caliper non-uniformity downstream from the coating region. This is especially useful for forming very thin void-free coatings using applicants' methods, and is not shown or suggested by Reade et al. The Office Action refers to a transfer roller or web as a "known means" of applying a coating to a moving web, but has not shown any recognition in the art that a transfer roller or web could be used to more readily apply very thin coatings. The Office Action has not provided other proper reasoning to support adding a transfer belt to Reade et al.'s device.

The Office action also says that:

"With respect to claims 53 and 54, the coating of Reade inherently has an initial maximum and minimum caliper and the method of Reade. This value is a result-effective variable effecting the coating thickness of the dry coating. Absent a showing of unexpected results demonstrating the criticality of the claimed range, it would have been obvious to one of ordinary skill in the art to optimize the initial and final calipers by routine experimentation [see MPEP § 2144.05(II)].

Reade et al. do not actually report coating uniformity except to say in Example 1 that "A dry coating of highly uniform thickness was obtained". Applicants' claims 53 and 54 do not represent mere routine experimentation or optimization of Reade et al.'s method but instead involve the use of pick-and-place devices in a configuration not shown or suggested in Reade et al.

The Office action also says that:

"With respect to claims 60 - 62, as noted above, Reade teaches a final coating thickness of between about 2.5 and 3.8 microns. It is clear, however, that this value may be adjusted and optimized by the amount of coating material, for instance. Absent a showing of unexpected results demonstrating the criticality of

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the values, it would have been obvious to one of ordinary skill in the art to optimize the final thickness by routine experimentation [see MPEP § 2144.05(II)]."

Claims 60 – 62 involve methods for making extremely thin coatings, much thinner than those disclosed by Reade et al. Applicants' claims 60 – 62 do not represent mere routine experimentation or optimization of Reade et al.'s method but instead involve the use of pick-and-place devices in a configuration not shown or suggested in Reade et al.

Applicants accordingly request withdrawal of the rejection of Claims 30, 33 – 36, 39 – 41, 43, 44, 50, 53, 54 and 60 – 62 under 35 USC §103(a) as being unpatentable over Reade et al.

Rejection of Claims 3, 8 and 9 under 35 USC §103(a)

Claims 3, 8 and 9 were rejected under 35 USC §103(a) as being unpatentable over Reade et al. as applied to claim 1 above, and further in view of U.K. Patent No. 1,278,099 (Hall). Applicants agree that Reade et al. do "not explicitly mention the use of more than two rollers." The Office Action says that:

"Hall teaches a process similar to that of Reade in which at least five, but a minimum of at least two, rollers are utilized [p. 1, ll. 41 – 46 and p. 1, ll. 57 – 60, for example].

"Based on the suggestion of Reade that a greater number of rollers results in a coating of improved uniformity, and the teaching of between at least two and at least five rollers, it would have been obvious to one of ordinary skill in the art to modify the method of Reade so as to use three, four, five, or more rollers to yield a coating of the desired uniformity."

Applicants respectfully disagree. Hall does not teach a process "similar to that of Reade in which at least five, but a minimum of at least two rollers are utilized". Hall refers to the use of counter-rotating smoothing rollers for coating regenerated cellulose and other materials, and says that:

"It seems to be generally understood that one smoothing roller per side is insufficient, and in one difficult case it has even been proposed that a minimum of five rollers per side be employed. In general, however, two rollers per side are used." (page 1, lines 41 – 46).

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This is not a discussion of a process "similar to that of Reade". Reade et al. show two contrarotating rollers on each side of the web, running at different speeds. The devices Hall refers to are not said to have rolls running at different speeds, and are believed to instead involve identical diameter rolls running at the same speed. If a defect passes through a relatively short train of identical diameter rolls running at the same speed, the rolls will repropagate the defect rather than reducing it (see page 10, line 23 through page 11, line 7). Reade et al. thus involve a different process than that described at page 1, lines 41 – 46 of Hall. Moreover, Reade et al. say that:

"Use of the second pair of contrarotating rollers results in a considerable further improvement in the quality of the coating." (col. 3, lines 46 – 48)

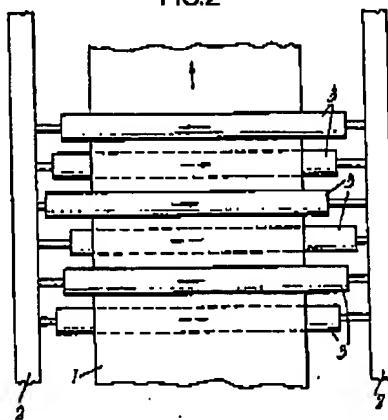
but do not say that "a greater number of rollers results in a coating of improved uniformity." This is reading more into Reade et al. than Reade et al. actually disclose.

Hall describes yet another process, in which a coated side of a film is contacted with:

"at least two smoothing rollers each of which rotates in the sense such that the surface of the roller in contact with the film travels in the opposite direction to the direction of travel of the film, and at least one of which is continuously moved to and fro in relation to the film" (page 1, lines 57 – 64)

Hall shows a device with three such rollers per film side, joined together on a frame:

FIG.2



Hall does not say that "at least five" rollers should be used in his device, and in fact does not even say that four rollers should be used.

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The method of applicants' claim 3 employs rolls that rotate in the direction of motion. The methods of applicants' claims 8 and 9 employ rolls that are carried with a belt or web in its motion. None of these methods are shown or suggested in Reade et al., Hall or in any proper combination of Reade et al. and Hall. These cited references employ contrarotating or counter-rotating rollers, and moreover as shown above involve only two or three such rollers.

Applicants accordingly request withdrawal of the rejection of Claims 3, 8 and 9 under 35 USC §103(a) as being unpatentable over Reade et al. and further in view of Hall.

Rejection of Claim 4 under 35 USC §103(a)

Claim 4 was rejected under 35 USC §103(a) as being unpatentable over Reade et al. in view of Hall as applied to claim 3 above, and further in view of U.S. Patent No. 1,043,021 (Mayer). The Office Action says that:

"The teaching of Reade in view of Hall is detailed above. While Reade teaches different rotational speeds, the reference does not, explicitly state that the rollers have different diameters.

"Mayer teaches that rollers of different diameters will rotate at different speeds [p. 6, ll. 44 – 48].

"It would have been obvious to one of ordinary skill in the art to modify the method of Reade so as to achieve the different roller speeds by using rollers of different diameters, as suggested by Mayer."

Applicants respectfully disagree. Mayer does not teach that "rollers of different diameters will rotate at different speeds" and more to the point does not recommend running at different peripheral speeds. The cited passage in Mayer says that:

"It will be understood of course that the coating rolls are of the same diameter but if made of different diameters the gearing would be changed so as to secure the same peripheral velocity." (page 6, lines 44 – 48)

Reade uses two identical rolls per side having different rotational speeds and thus different peripheral speeds. Mayer does not teach running rolls at different peripheral speeds but rather recommends gearing the rolls so they will have the same peripheral speed.

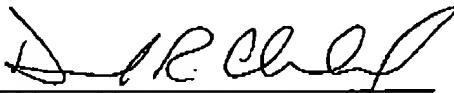
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Applicants accordingly request withdrawal of the rejection of claim 4 under 35 USC §103(a) as being unpatentable over Reade et al. in view of Hall as applied to claim 3 above and further in view of Mayer.

Conclusion

Applicants amended the title, specification and several of the claims as recommended by the Examiner. The remaining claims are patentable as is or as amended. The cited references do not show applicants' claimed methods. Applicants accordingly request reconsideration and withdrawal of the rejections and passage of their application to the issue branch.

Respectfully submitted on behalf of
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